

## CLAIMS

What is claimed is:

1. A flatbed scanner, comprising:

a housing;

a transparent platen atop the housing for receiving an object to be scanned;

a carriage operable to travel along a first direction and a second direction, the carriage comprising:

a light source for illuminating the object; and

a rectangular photodetector array for simultaneously detecting light intensity of multiple scan lines, the rectangular photodetector array comprising more than three rows of photodetectors.

2. The scanner of claim 1, wherein the carriage further comprises:

a mounting plate having a horizontal guide, the light source and the rectangular photodetector array being mounted on the mounting plate;

a first motor linked to a first gear; and

a horizontal carriage bar defining a horizontal guide channel for receiving the horizontal guide and a horizontal gear channel for receiving the first gear, the first motor being operable to drive the first gear to move the carriage along the horizontal direction.

3. The scanner of claim 2, wherein:

the horizontal carriage bar has vertical guides;

the carriage further comprises a second motor linked to a second gear; and

the housing defines vertical guide channels for receiving the vertical guides and a vertical gear channel for receiving the second gear, the second motor being operable to drive the second gear to move the carriage along the vertical

direction.

4. The scanner of claim 1, wherein the light source comprises a ring of light emitting diodes formed around the rectangular photodetector array.

5. The scanner of claim 1, wherein the rectangular photodetector array comprises a complementary metal oxide semiconductor (CMOS) image sensor array.

6. The scanner of claim 5, wherein the light source comprises light emitting diodes located on the same die as the rectangular photodetector array.

7. A method for operating a flatbed scanner, comprising:

capturing a first image of an object placed on a transparent platen of the scanner with a rectangular photodetector array, the rectangular photodetector array comprising more than three rows of photodetectors;

moving the rectangular photodetector array in a first small increment along a first direction and a second small increment along a second direction, the first increment being less than a first spacing between adjacent photodetectors on the photodetector array along the first direction, the second increment being less than a second spacing between adjacent photodetectors on the photodetector array along the second direction; and

capturing a second image of the object.

8. The method of claim 7, further comprising combining the first and the second image to form a scanned image of the object.

9. The method of claim 7, further comprising:

moving the rectangular photodetector array in a large increment along the first direction; and

capturing a third image of the object.

10. The method of claim 9, wherein the large increment is at least a dimension of the rectangular photodetector array along the first direction.

11. The method of claim 9, further comprising:

moving the rectangular photodetector array in the first small increment along the first direction and the second small increment along the second direction;  
and

capturing a fourth image of the object.

12. The method of claim 11, further comprising combining the first, the second, the third, and the fourth image to form a scanned image of the object.

13. A sheet feed scanner, comprising:

a housing;

feed rollers that moves a document in a first direction;

a carriage operable to travel along a second direction, the carriage comprising:

a light source for illuminating the document; and

a rectangular photodetector array for simultaneously detecting light intensity of multiple scan lines, the rectangular photodetector array comprising more than three rows of photodetectors.

14. The scanner of claim 13, wherein the carriage further comprises:

a mounting plate having a horizontal guide, the light source and the rectangular photodetector array being mounted on the mounting plate;

a first motor linked to a first gear; and

a horizontal carriage bar defining a horizontal guide channel for receiving the horizontal guide and a horizontal gear channel for receiving the first gear, the first motor being operable to drive the first gear to move the carriage along the horizontal direction.

15. The scanner of claim 13, wherein the light source comprises a ring of light emitting diodes formed around the rectangular photodetector array.

16. The scanner of claim 13, wherein the rectangular photodetector array comprises a complementary metal oxide semiconductor (CMOS) photodetector array.

17. The scanner of claim 16, wherein the light source comprises light emitting diodes located on the same die as the rectangular photodetector array.

18. A flatbed scanner , comprising:

a housing;

a transparent platen atop the housing for receiving an object to be scanned;

a light source for illuminating the entire object;

optics for directing light reflecting off the entire object to a rectangular photodetector array; and

the rectangular photodetector array for simultaneously detecting light intensity of the entire object, the rectangular photodetector array comprising more than three rows of photodetectors.